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The increasing use of firearms from the middle of the fifteenth century in different parts of the world is often seen as a crucial factor in the rise of centralized monarchical states. In Europe it was a manifestation of the overall weakening of the position of gentry, as against the king. This was a direct consequence of the increasing vulnerability of signiorial castles to the field artillery maintained by the king and of greater effectiveness of the musket-wielding infantrymen against mounted knights.¹ In the Islamic East, where the mounted archers were the mainstay of the imperial authority, this phenomenon appeared to have manifested itself in an altered form. The highly centralized empires of sixteenth century like the Ottoman Empire, the Safavid Empire, the Uzbek Khanate and the Mughal Empire in India are for example characterized by Marshall G.S. Hodgson as the 'gunpowder empires'. According to him, the changes promoted by the introduction of firearms in these states were not restricted to army organizations. The firearms also 'gave an increased advantage over local military garrisons, to a well organized central power which could afford artillery'.² In this paper*, such an impact is examined in the context of state formation in India with a special focus on the Mughal Empire.

A primitive type of gunpowder artillery was already in vogue in different parts of the India during the second half of the fifteenth century. Already by the middle of the century, there was known in North India a firearm with designation *Kashakanjir* which threw balls 'by the extensive force of combustible substances (*darruha-i atishin*)'. It was in all probability a cannon. A weapon resembling cannon is also reported in Kashmir. Srivara records that this weapon 'was called *topa* in Muslim language while in the Kashmiri dialect it was called *kanda*'. He also alludes at its being made of an alloy.³ This is also supported by allusions in two other contemporary texts, *Ma'asir-i Mahmud Shahi* by Shihab Hakim (1468) and *Riyazu'l insha* by Mahmud Gawan (1470) to the presence in Malwa and Deccan of *ra'd/kaman-i ra'd* (literally, lightening /lightening bow) which are identified by Firishta as proper cannons. According to one criptic description by Shihab Hakim, it was 'made from an alloy of copper'.⁴

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The destructive capacity of gunpowder artillery of fifteenth century, notwithstanding its primitive nature was vastly greater than that of the mechanical devices of the earlier period. It is indicated by the contemporary descriptions of sieges of Mandalgarh (1457) and Machal (1470)⁵ as well that of Champanir (1485) recorded by Firishta (possibly copying, as was his wont, an earlier text).⁶ This should explain why some of the forts known for their strength and solidity sometimes had to be redesigned in the fifteenth century. As was the case with Vijaymandirgarh fort of Bayana, this redesigning was aimed at enlarging the enclosed space which could have been with the idea of making it difficult for a besieging force to aim its cannons at the built-up areas of the fort. Other similar examples from the Aravali tract are those of the forts of Mandalgarh and Champanir.⁷

The artillery pieces in India during the fifteenth century being made uniformly of brass or bronze were naturally very costly. These were generally beyond the means of most of the *zamindars* as well as the Rajput chieftains. The ruler of Mewar was perhaps one of the few exceptions among them.⁸ These new weapons were possessed in appreciable numbers only by more prosperous regional kingdoms like those of Gujarat, Malwa, Bahmanis and Vijayanagara. Each of them is credited with overpowering local chiefs of their regions by reducing their forts located in less accessible tracts. The reduction of these forts was apparently facilitated by the use of newly introduced gunpowder artillery which was as yet beyond the reach of most of the local chiefs.

It is, therefore, understandable that the appearance of gunpowder artillery synchronized with a distinct phase of internal consolidation leading to a limited territorial expansion in the case of more prosperous regional kingdoms of fifteenth century. Internal consolidation was always marked by the strengthening of king's control over the nobles and, more importantly, by the suppression of the local chiefs some of whom hitherto enjoyed autonomous status on account of their large caste or tribal following and forts held by them in peripheral zones. This is evident from the history of Gujarat and Bahmani Empire under Mahmud Begarha (1459-1511)⁹ and Muhammad Shah (1463-82) respectively.¹⁰ In the case of Vijayanagara Empire again the use of firearms is considered to be the most important factor behind its successes not only against the Bahmanis, but also 'against the enemies within', such as powerful chiefs of Tamil region.¹¹ These developments in a way tended to conform to Marshall G.S. Hodgson's view that the introduction of relatively expensive artillery would often, lead to the growth of 'a well organized central power'.

The impact of European gunnery introduced in India on a large scale in the beginning of the sixteenth century was, however, a much more complex process which I propose to examine here with reference to the rise and decline of the Mughal Empire.

During the sixteenth century, the heavy mortars produced in India registered a striking advance. This was a direct result of improved designs and casting methods learnt from the west through contact with the Portuguese as also through expertise brought with him by Babur.¹² However, the problems like lack of mobility, proneness to accidents, slow rate of firing and large consumption of gunpowder persisted causing a decline in their over all popularity. Already by the middle of the sixteenth century these had come to be treated as impressive exhibits probably meant to overawe the common people with the military prowess of the Empire than for actual use in warfare.¹³

It is of interest to remember that in Babur's own descriptions of the battles of Panipat (1526) and Kanwah (1527) where he experimented with the deployment of firearms in the battlefield with some success, heavy mortars, (*kazans*) are not mentioned. Though Humayun had deployed 21 mortars in the Battle of Kanauj (1540) these did not prove to be of much help.¹⁴ Similarly, in 1553, Islam Shah found it difficult to carry his mortars to Punjab for checking Humayun's anticipated advance thither.¹⁵ In 1556, the entire park of Adil Shah Sur's slow moving mortars was captured by the Mughals before these could be deployed against them at Panipat.¹⁶

Under Akbar, heavy mortars did not figure prominently in the process of territorial expansion. Apart from the sieges of Chittor (1568) and Ranthambhor (1570), military operations leading to territorial acquisitions in the early decades of Akbar's reign did not involve prolonged sieges requiring the use of mortars. Mughal Empire's expansion during this phase was achieved primarily with the use of mounted archers supported marginally by light artillery and musketeers. In the second phase of territorial expansion under Akbar, during 1585-1601, again artillery was used sparsely which was seemingly on account of the difficulty of transportation.¹⁷ This eclips in the popularity of mortars in the Mughal Empire temporarily ended during the decades Aurangzeb was frequently faced with the task of attacking numerous hill forts in Deccan.¹⁸ Acquisition of a large number of siege mortars in the Deccan towards the end of the seventeenth century, however, did not prove to be of much strategic advantage for the Mughals. They continued to be vulnerable to Maratha light cavalry resorting to hit and run tactics.

From the above it is quite evident that the siege artillery of the Mughal Empire did not command 'the fateful significance politically' that is ascribed to the same category of firearms in a gunpowder empire of Hodgeson's conception. Abu'l Fazl, no doubt, goes out of his way in characterizing artillery as an instrument of empire building¹⁹ in words remnicent of the theory of gunpowder empires but the history of Akbar's military campaigns recorded by him does not bear out this characterization.

Two other firearms introduced from Europe in the sixteenth century were:

(a) light cannons mounted on carriages and (b) matchlock muskets. These, no doubt, were easily integrated in the prevalent form of warfare based on the use of mounted archery by adopting variable patterns of the battle-plan of 'the Ghazis of Rum' introduced in India by Babur (1526). In this battle plan, light artillery and musketry were protected by a barricade carrying gapes to facilitate the free movement of cavalry.²⁰ Both of these firearms appear to have contributed to the growth of Mughal Empire as a centralized state. The matchlock musket particularly seems to have emerged as an instrument of centralization in so far as its use came to acquire special relevance to centre's control of internal resources.²¹ During the seventeenth century, on the other hand, dissemination of muskets among peasant communities also became a factor contributing to the militancy of disaffected rural population.²² It would, perhaps, be useful to dilate separately on the status of each one of them in the Mughal system.

There was a distinct improvement in the basic design and general performance of the light artillery during the first half of the sixteenth century which facilitated their deployment and effective use in the siege operations as well as open battles. The earliest specimens of these light cannons (*zarb-zan*) used by Babur (1526-30) were, in all probability, miniature replicas of his heavy mortars (*kazans*). Subsequently in 1540s, the size of an average light cannon was reduced considerably. This was possibly aimed at improving the quality of casting within the constraints imposed by the use of manual bellows. It also economised on the quantity of gunpowder consumed.²³

The introduction from Europe of the art of making less costly wrought iron barrels naturally contributed to making light cannons much cheaper. Besides a considerable increase in the total number of light cannons possessed by the Mughals and their Afghan adversaries in North India, many of the local chiefs all over the country began to possess them in limited numbers. These light cannons when combined with musketry were generally perceived as effective in defending fortified positions. The enhanced military clout of the Rajput chieftains, controlling strongholds on the outer periphery of the Gangetic plain during the first half of the sixteenth century, may perhaps be linked to this development.²⁴ The exceptionally favourable terms offered by Akbar to the Rajput chieftains to induce them to join his service may be viewed from this perspective as well.

The Mughal response to the increased effectiveness of the light cannons was represented by their attempt from the very beginning, to enforce imperial monopoly on the production and use of every kind of firearms.²⁵ It also led to a drive on their part to increase manifold the number of light cannons in their arsenal. Under Akbar there was a concerted attempt to further improve and also to add to their variety. These improvements seem to have led to the division of light cannons cast in bronze/brass as well as those forged from wrought iron into two broad categories: (a) *zamburaks* carried with king in the so-called

'artillery of stirrup'; and (b) still lighter pieces like *narnals* and *gajnals* distributed for deployment on the ramparts of the forts located in different provinces.²⁶

Perhaps, the most important innovation relating to military use of firearms in the Mughal Empire during seventeenth century was the placing of light cannons on some kind of swivels mounted on camels.²⁷ It is likely that the notion of a light cannon fitted to a swivel on the back of a camel, the *shaturnal* (camel barrel), came to India from West Asia some time in the beginning of the seventeenth century. This cannon is described by Bernier as a 'small field piece'. Being better tuned to the requirements of battles fought with fast moving cavalry, *shaturnals* often played a far more important role in action than the 'artillery of stirrup' represented by a comparatively small number of medium size cannons mounted on horse drawn carriages. The *shaturnals* were seemingly Indian and West Asian substitutes for the latest cast-iron field guns of Europe with the significant difference that these, instead of rendering obsolete the dominant form of mounted combat, tended to give it added support. Despite the constraints imposed by the necessity of camel to kneel on the ground to open fire, the *shaturnals* often proved to be more effective than the cannons carried on slow moving carriages. The speed with which several hundred pieces of light cannon, capable of keeping up fairly rapid fire, could be moved from one point to another during the battle would, on many an occasion, be crucial to the outcome of a sharply contested action.²⁸ This is for example borne out by Mirza Nathan's account of the Battle of Daulabapur (1612)²⁹ and those of the Battle of Samugar (1658) by Bernier and Manucci.³⁰

The *shaturnals* were of course not out of the reach for many of the rebellious Rajput chiefs and Marhatta *sardars* defying the Mughals during the second half of the seventeenth century. But the rebels were certainly not in a position to deploy them in a matching strength. To this limited extent, it would appear, the increasing presence of the *shaturnals* in the field artillery, contributed to the Mughal Empire's holding on its own in the face of mounting rebellions down to the end of Aurangzeb's reign.

Matchlock muskets present in India from the early phase of Mughal conquest (1526-56)³¹ came to be regarded as effective weapons of general combat. As was the case at Panipat in 1526, these came to be used from behind barricades formed by bullock-carts tied together in pairs for harassing the on rushing cavalry. The musketeers would some time also provide cover during the battle to artillery carts on the move which appears to have been their role at Knwah (1527).³² This had a parallel in muskets' singular contribution to the Ottoman victories over Shah Ismail at Chaldiran (1514) and over Mamluks in 1517.³³ From the history of Mughal Empire in India many more instances can be cited to illustrate that sometimes a skilful use of muskets could prove to be of

critical significance in deciding the outcome of a battle. This role of musketeers would often tend to get enhanced in localised small scale conflicts.³⁴

In this context William Irvin's view that down to the middle of the eighteenth century, the bow and arrow was considered in India a much more effective instrument of combat than the musket³⁵ needs to be viewed in its proper perspective. This view seems to be mainly based on a statement of Bernier where he is comparing the 'astonishing quickness' with which the mounted archers discharged their arrows with the slowness of horsemen carrying muskets who were obliged to dismount for firing a volley. There is no denying the fact that much more time would pass between each matchlock shot than between the shooting of successive arrows. But the simple point is that the matchlock fire could hit much harder with a pelet and be effective upto a much longer distance; and thus frequency alone could not be the decisive factor. The musket fitted with matchlock when used from the ground in a skilful manner could prove to be a devastating instrument of war. Even a small number of matchlockmen fighting from the ground, if deployed innovatively, could contribute to breaking up the onslaught of a much larger body of horsemen.³⁶

The recognition of muskets as an increasingly effective factor in warfare is reflected in the anxiety of the Mughal imperial authority to retain a large body of musketeers. The strength of foot-musketeers in the service of Mughal king rose from roughly 1200 in 1526 to 35,000 around 1595.³⁷ Abu'l Fazl accordingly classifies musketeers (*banduqchis*) as part of the royal household (*manzil abadi*) and not as part of the army (*sipah abadi*).³⁸ It is understandable that along with artillery (involving heavy expenditure) comparatively affordable muskets should have been controlled exclusively by the Emperor. This would suggest that the muskets too were considered a major instrument of power. Leaving muskets entirely to the care of the nobles was evidently not considered safe.

Under Akbar's *mansab* system, from the very beginning, the officers were allowed to have in their contingents among *dakhili* foot-soldiers a partly of foot-musketeers whose strength would be 12½ per cent of the total number of horsemen in the contingent. In other words, there would be present in each contingent one musketeer for eight horsemen. But, on paper, these *dakhili* musketeers also were treated as personnel in the direct employ of the Emperor and were paid their stipends not by the officers concerned but by the central treasury.³⁹ This system appears to have continued in the seventeenth century in a modified form. The term *dakhili* fell in disuse, but the officers often came to maintain a larger number of musketeers than prescribed under the rules framed during Akbar's reign. An inventory (*siyaha*) of the detachment commanded by Bahramand Khan in 1689 shows a ratio of one musketeer to five horsemen.⁴⁰ Some times under Aurangzeb, select nobles were also allowed the rare privilege of

recruiting foot-musketeers directly in their contingents who would again be treated as being in the central government's service (*naukar-i sarkar-i wala*).⁴¹

There is some evidence indicating that from the latter part of Akbar's reign the foot-musketeers came to partly replace ordinary cavalry as the instruments of local control. The use of musketeers in village level operations could have been a much less costly affair than the cavalry troops of any variety as is suggested by the salaries of the two type of troopers. The deference between the salaries of centrally maintained *yakaspas* and foot-musketeers (*sair piyada banduqchi*) ranged from 4½: 25 to 6:25.⁴² Moreover, the total cost of equipping a cavalry trooper, even of the meanest order, inclusive cost of a horse (with its apparel), weapons and armour, would be quite considerable. This cost would be much higher than the cost of a musket and ammunition needed for equipping a musketeer.⁴³ Under Todar Mal's regulations of 27th R.Y. /1582-3, the *jagirdars* as well as the officials of the territory yielding revenues for imperial treasury (*khalisa*) could take the help of the imperial musketeers stationed in every locality under the command of an *amir-i chakla* (commandant of a *chakla*, a territorial unit within a province). For this assistance they were made 'responsible for the collection of one *dam* per *bigha* of cultivated land for the maintenance (*nigahdasht*) of the musketeers. That this system was actually enforced in some of the provinces is borne out by the extant text of one of Akbar's orders appointing a *faujdar* in the province of Lahore.⁴⁴

Many instances can be cited to illustrate the effective use of muskets by the Mughals against defiant rural populace as well as rebellious chiefs during the seventeenth century.⁴⁵ These go to clearly indicate that down to the end of Aurangzeb's reign the matchlock musket played a conspicuously significant role as an instrument of local control.

Rapid dissemination of muskets in the countryside during the first half of the seventeenth century made the task of exercising local control and of ensuring the smooth flow of land revenue more onerous. Even a marginal improvement in the fighting efficiency of the disaffected peasants and *zamindars* as a consequence of their access to muskets of even most primitive type would become a matter of grave concern to the Mughal authorities. One response of the Mughal imperial system to this new situation was the creation under Jahangir (1605-1627) of a corps of mounted musketeers called *barqandaz* among the centrally maintained *ahdi* horsemen.⁴⁶ A few decades later, some of the senior nobles, for example Mirza Raja Jai Singh also came to enrol, possibly with the tacit approval of the imperial authority, in their contingents musket carrying horsemen.⁴⁷ Down to 1658, one knows on Bernier's testimony, most of these *barqandaz* troops were *yak aspa* horsemen riding *yabu* or still more inferior moutns.⁴⁸

This attempt at combining horsemanship with the use of musket was

obviously aimed at enhancing the striking power of the musketeers against the rural rebels for whose suppression they are known to have been frequently employed in localized military operations since Akbar's time. The performance of mounted musketeers in a large scale action like Battle of Samugar (1658) would no doubt appear to be rather not very impressive as compared to that of mounted archers forming the bulk of opposing armies. This should not, however, blur one's view of the effective role that the *barqandaz* troops often played in scattered operations. They came to be frequently used in the Deccan as well as in other regions against dispersed resistance of the local authorities particularly that of the Marhatta *sardars*. The effectiveness of mounted musketeers in dispersed fighting is borne out by a number of episodes recorded in *waqa'i' sarkar Ajmer wa Ranthambhor* and *Mazhar-i Shahjahani*.⁴⁹

Though the number of mounted musketeers in the contingents of select nobles (the Kachchwaha chief of Amber being one of them) may have increased appreciably during Aurangzeb's reign, but the muskets used by them as also by most of the *barqandaz ahdīs* continued to be unwieldy matchlocks which could be fired only after dismounting. On the other hand, during the same period, some of the rural insurgents in North India, like Jats of Mathura region started using matchlocks⁵⁰ which were in-any-case more efficient than the crudely made arquebuses available to them till then. It could have been partly in response to this situation that there was created in the Mughal army a body of mounted musketeers possessing the skill of firing their muskets without dismounting. Islam Khan Rumi's *barqandaz* retainers were perhaps one such group. They are reported to have been the experts of Ottoman style of fighting based on the use of musket (*madar-i jang-i Rumi bar banduq bud*).⁵¹ It is likely that these new type of musketeer horsemen were armed with the Turkish versions of European flintlocks. Specimen discription of a flintlock reproduced by Anand Ram Kayath in *Siyaq-nama* (1696)⁵² indicates that this musket was known in the Mughal military establishment during Aurangzeb's reign. But, as is evident from Bhimsen's description of Islam Khan Rumi's clumsy method of supplying gunpowder to his horsemen during an skirmish with Marathas, the rigidity of the Mughal military organization based on a contract system did not suit this new form of warfare. Apparently, the new system required a more centralized organization of production, distribution and supply of firearms of different types which was practically ruled out in the *mansab* system of the Mughals.⁵³ It is, therefore, understandable that, despite there being strong reasons for shifting to this new form of musketeering, the flintlock musket and the skill of using it from horseback did not find wide acceptance in the Mughal Empire.

While concluding this discussion one may reiterate that of all the different type of firearms introduced by Babur in India, the wide use of matchlock musket, perhaps, had particular relevance to centre's control of internal

resources in the Mughal Empire. That is why muskets were considered 'honourable' not only when carried by cavalry but also in the hands of ordinary musketeers firing from the ground.⁵⁴ The high status of musket was reflected in Humayun's establishing in 1535 a rule that his leaving the *Diwan* would be announced by firing of a musket.⁵⁵ Significantly, Abu'l Fazl makes it a point to mention his hero Akbar's interest in this weapon and his being unsurpassed in making and handling it. In *A'in-i Akbari* one of the three military skills prescribed for a commandant administering a province is that of shooting with musket. It is put at par with horsemanship and archery.⁵⁶ It is, therefore, not surprising that the foot-musketeers, though poorly paid as compared to cavalry troopers, were allowed certain concessions like, for example, payment in advance a part of salaries which was not deducted during campaigns.⁵⁷ Their average stipends were always higher than those of ordinary foot-soldiers of other categories.⁵⁸

A similar situation obtained with regard to mounted musketeers. As early as 1636 *sih aspa* (3 horse) and *chahar aspa* (4 horse) *ahdi barqandaz* stationed in Deccan were allowed to maintain one horse less than the number indicated by their ranks (*du aspa*). Till then this privilege was not allowed to ordinary *ahdi* horsemen.⁵⁹ Again additional payment to some of the horsemen in the contingent of the Kachchwaha chief of Amber during Aurangzeb's reign, on their equipping themselves with muskets (*azafa ba-shart-i banduq*) also appears to point to musket's special status as a weapon of war in the Mughal Empire.⁶⁰ Although, as Irfan Habib stresses, the main strength of the Mughals lay in their mounted archery,⁶¹ the matchlock musket appears to have contributed from the very beginning significantly to the exercise of imperial control over disaffected localities or tracts.

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Notes

- 1 Cf. Carlo M. Cipola, *Guns and Sails in the Early Phase of European Expansion, 1400-1700*, London, 1965, p.28; Geoffrey Parker, *The Military Revolution: Military Innovation and Rise of the West, 1500-1800*, Cambridge, 1988, p.8.
- 2 Marshall, G.S. Hodgson, *The Venture of Islam: The Gunpowder Empires and Modern Times*, Vol.III, pp.17-18, 26.
- 3 Ibrahim-i Qawam Faruqi, *Sharafnama-i Ahmad Munnairi* (1457-75), MS entitled *Farhang-i Ibrahimi*, AMU, Aligarh, Habib Ganj Collection 53/22, under

- Kashakanjir*. See also Jonaraja, *Rajatarangini* (1459) tr. by T.C. Dutt, *Kings of Kashmir*, Delhi, 1968, pp.105-6 and Srivara, *Jaina Rajatarangini*, (1486), tr. by Kashi Nath Dhar, New Delhi, 1996, p.39.
- 4 Shihab Hakim, *Ma'asir-i Mahmud Shahi* (1467-8), ed. Nurul Hasan Ansari, Delhi, 1968, pp.56, 87; Mahmud Gawan, *Rayazu'l Insha* (1470), ed. M. Shafi, Lahore, 1941-9, p.72. See also Iqtidar A. Khan, *Gunpowder and Firearms: Warfare in Medieval India*, New Delhi, 2004, p.42.
 - 5 *Ma'asir-i Mahmud Shahi*, pp.85-9 and *Rayazu'l Insha*, pp.72-4.
 - 6 Muhammad Qasim Hindu Shah Firishta, *Tarikh-i Firishta* (1607), Vol.II, Kanpur, 1884, pp.202, 251.
 - 7 Cf. *Gunpowder and Firearms*, pp.48-9.
 - 8 *Ma'asir-i Mahmud Shahi*, p.56. The chief of Mewar is reported to have supplied two *kaman-i ra'ds* made of an alloy of copper (*haft-josh*) to the ruler of Gagaraun in 1442-3.
 - 9 See *Gunpowder and Firearms*, pp.50-2.
 - 10 Haroon Khan Sherwani, *The Bahmanis of Deccan*, Hyderabad, 1953, pp.296, 323-4. Bahamani Kingdom is described as attaining 'a height unequalled in the whole of its history' during the 'premiership' of Mahmud Gawan under Muhammad Shah Bahmani. Cf. *Rayazu'l Insha*, p.72. Mahmud Gawan is reported to have used *kaman-i ra'd*.
 - 11 Burton Stein in *The Cambridge Economic History of India*, eds., Tapan Raychaudhuri and Irfan Habib, Vol.I, c.1200-1750, Cambridge, 1982, p.119.
 - 12 See Iqtidar A. Khan in *Journal of Royal Asiatic Society*, April 1999, pp.27-34.
 - 13 *Gunpowder and Firearms*, pp.94-5.
 - 14 Mirza Haidar Doghlat, *Tarikh-i Rashidi*, MS, AMU, Aligarh, University Collection, No.34, f.351a.
 - 15 'Abdul Qadir Badauni, *Muntakhab-ut-tawarikh*, (1596), ed. Ahmad 'Ali and others, Vol.I, Calcutta, 1869, p.412.
 - 16 Abu'l Fazl, *Akbar-nama*, ed. Agha Ahmad 'Ali and 'Abd al-Rahim, Vol.II, Calcutta, 1873-87, p.36; Nizam al-Din Ahmad, *Tabaqat-i Akbari*, ed. B. De, Vol.II, Calcutta, 1913, p.131.
 - 17 Cf. W.H. McNeill, *The Pursuit of Power, Technology, Armed Force and Society since A.D. 1000*, Chicago, 1982, pp.95, 98. Attributes the 'precarious' nature of Mughal control in the Deccan to the difficulty of moving siege guns long distance overland'.
 - 18 *Gunpowder and Firearms*, pp.97-7.
 - 19 *A'in-i Akbari*, (1598), Vol.I, 1893, p.82. See also *Journal of Royal Asiatic Society*, April 1999, p.27.
 - 20 Cf. A.S. Beveridge, *Babur-nama in English*, reprint, London, 1969, pp.550, 568-9.
 - 21 *Gunpowder and Firearms*, pp.85 f.n. 46, 150.
 - 22 Op.cit., pp.164-5.

- 23 Op.cit., pp.74-9.
- 24 Op.cit., pp.103, 120-21 f.ns. 43 & 44.
- 25 Op.cit., pp.91-2. Compare *A'in-i Akbari*, Vol.I, p.82 and *Babur-nama in English*, p.117.
- 26 *A'in-i Akbari*, Vol.I, p.82.
- 27 Francois Bernier, *Travels in the Mogul Empire, 1656-58*, tr. A. Constable, revised by V.A. Smith, London, 1916, p.254.
- 28 Compare, *Gunpowder and Firearms*, pp.107-10.
- 29 J.N. Sarkar, *Military History of India*, reprint, Delhi, 1970, p.89.
- 30 Bernier, p.49; Nicolao Manucci, *Storia do Mogor, 1656-1712*, tr. William Irvine, Vol.I (London, 1907-8), reprint Calcutta, 1965, p.254.
- 31 For an arguement that muskets brought to India by Babur were matchlocks of Ottoman origin see *Gunpowder and Firearms*, p.143.
- 32 *Babur-nama in English*, pp.468-9, 473-4, 557-8, 568-9.
- 33 Devid Ayalon, *Gunpowder and Firearms in the Mamluk Kingdom*, London, 1962, pp.60, 88-9.
- 34 Yusuf Mirak, *Mazhar-i Shahjahani* (1634), ed. Pir Hasamuddin Rashidi, Part 2, Karachi, 1961, pp.139-40. There is described a skirmish between a party of Mughal horsemen using muskets and a large band of Nahmardi tribesmen of *pargana* Sehwan (Sind).
- 35 William Irvine, *The Army of the Indian Moghuls*, reprint New Delhi, 1962, p.103.
- 36 Cf. Sidi Ali Reis, *Travels and Adventures of the Turkish Admiral Sidi Ali Reis*, tr. A. Vamberey, London, 1899, pp.37. A band of 30 foot-musketeers forced a large body of Rajput horsemen to retire.
- 37 *Gunpowder and Firearms*, p.150.
- 38 *Ain-i Akbari*, Vol.I, pp.84-5.
- 39 *Op.Cit.*, Vol.I, pp.121, 134. Compare Shireen Moosvi, *The Economy of the Mughal Empire, c.1595: A Statistical Study*, O.U.P., 1987, p.223. She interpretes the text here differently.
- 40 *Selected Documents of Aurangzeb's Reign*, ed. Yusuf Husain Khan, Hyderabad, 1958, pp.200-1.
- 41 For Maha Singh Bhadoria's request to be allowed such a privilege see *Waqqa'i' Sarkar Ajmer wa Ranthambhor*, (1678-80), MS, Asafia Library, Hyderabad, *Fan-i Tarikh*, Aligarh transcript, pp.417-18.
- 42 Irvin, *The Army of the Indian Moghuls*, p.173. Compare R.A. Alvi, *Studies in the History of Medieval Deccan*, Delhi, 1977, p.30.
- 43 The lowest cost of the musket as given by Abu'l Fazl is ½ a rupee while the price of a horse is set at Rs.2 Again an ordinary handgun could be obtained for half the cost of an ordinary sword. Cf. *A'in-i Akbari*, Vol.I, p.82.

- 44 Abu'l Fazl, *Akbar-nama*, Vol.III, ed. Agha Ahmad 'Ali and 'Abd al-Rahim, Calcutta, 1887, p.382. Cf. Abu'l Qasim Namakin, *Munshat-i Namakin*, MS, AMU, University Collection 26, f.675b.
- 45 Cf. *Gunpowder and Firearms*, pp.153-4.
- 46 For a reference to *barqandaz sawars* see *Tuzuk-i Jahangiri*, ed. Saiyid Ahmad, Ghazipur and Aligarh, 1863-4, p.238.
- 47 For a reference to a *barqandaz sawar* serving in the contingent of a Rajput noble in *suba* Deccan in the year 1636, see *Select Documents of Shahjahan's Reign*, ed. Yusuf Husain Khan, Hyderabad, 1950, p.25. Compare, *Gunpowder and Firearms*, p.152.
- 48 Bernier, p.217. For musketeers participating in the Battle of Samugar (1658) he mentions three rates of payment: Rs.20/- Rs.15/- and Rs.10/- per month. These obviously are not the scales of foot-musketeers who were never paid more than Rs.6/- per month. Cf. Shireen Moosvi, *The Economy of the Mughal Empire, c.1595*, p.227. *yak aspa ahdis* were paid Rs.20/- per month.
- 49 This is borne out by a perusal of Jaipur Record No.3833: '*ulufa sipahian*, in the Rajasthan State Archives, Bikaner.
- 50 Manucci, *Storia do Mogor*, 1656-1712, tr. W. Irvine, Vol.II, (London, 1907-8), reprint, Calcutta, 1965, p.131.
- 51 Bhimsen, *Nuskha-i Dilkusha*, MS., Br. Library, Or. 23, f.66a.
- 52 Nand Ram Khayasth, *Siyah-nama*, Lucknow, 1879, p.154.
- 53 Athar Ali, *The Mughal Nobility under Aurangzeb*, revised edition, Delhi, 1997, p.xx) was first to make this point.
- 54 For a contrary view see Stewart Gordon, 'The limited Adoption of European Style Military Forces by the Eighteenth-century Rulers in India', *The Indian Economic and Social History Review*, Vol.xxxv, No.3 and Jos Gommans, *Mughal Warfare*, London, 2002, p.161.
- 55 Khawar Shah bin Qibad al-Husaini (d.1565), *Tarikh-i Ilchi-i Nizam Shah*, MS, British Library, Add. 23513, ff. 228b-229a.
- 56 A'in-i Akbari, Vol.I, p.83, 196; See also, 'Ali Ahmad Khan, *Mirat-i Ahmadi*, ed. Nawab Ali, Vol.I, Baroda, 1928, p.167.
- 57 Cf. *Ruqq'a-i Hakim Abu'l Fath Gilani*, ed. Muhammad Bashir Husain, Lahore, 1968, p.128.
- 58 A'in-i Akbari, Vol.I, pp.82, 134; Shireen Moosvi, *The Economy of the Mughal Empire*, pp.229-30. Compare, Irvine, *The Army of the Indian Moghuls*, pp.167, 173.
- 59 *Select Documents of Shah Jahan's Reign*, ed. Yusuf Husain Khan, pp.24-25.
- 60 Several such orders are to be found in the bundle, *Siyaha ziyadti wa kami daftar-i bakhshi, farsi*, 1129H/ 1774 Sambat: in Rajasthan State Archives, Bikaner.
- 61 Irfan Habib, *The Agrarian System of Mughal Empire, 1556-1707*, second, revised edition, New Delhi, 1999, p.364.